

Topics

- Inflammatory Bowel Disease
- Tobacco consumption in india
- Artificial intelligence
semiconductor
- The Funan Techo canal
- Blue Lagoon
- Mains



By saurabh Pandey



Target Mains -2024/25

Q "Hydro diplomacy will shape relationship between countries in south and southeast asia" Discuss

प्रश्न "हाइड्रो डिप्लोमेसी दक्षिण और दक्षिण-पूर्व एशिया के देशों के बीच संबंधों को आकार देगी" चर्चा करें

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The rising incidence of paediatric inflammatory bowel disease in India

IBD is a chronic autoimmune condition where the white blood cells mistakenly identify cells in the human gut as their enemy and decide to attack it, causing ulcers in the mucosa. As a result a child with IBD may develop fever, loose stools and bloody diarrhoea. These children may lose weight, muscle mass, and may have vitamin deficiencies

Srinivas S.

When 10-year-old Durga recently came with her parents from their village in Andhra for a consultation, the family was worried that she was not thriving as well as her classmates and friends of the same age. She was pale, and had recurrent fever over the previous few months. She had also developed recurrent bouts of loose stools, sometimes bloody. Durga had lost a lot of weight and no longer resembled the child from a photograph taken during Deepawali. She underwent a number of tests which revealed that she was anemic and had raised inflammatory markers. An ultrasonogram of the abdomen showed thickened bowel walls with increased vascularity (blood flow). She underwent a diagnostic upper gastro intestinal endoscopy and colonoscopy, which revealed multiple ulcers in her intestines. Biopsies from various segments of her bowel helped confirm the diagnosis Inflammatory Bowel Disease (IBD).

IBD is a chronic autoimmune condition where the white blood cells or the body's soldiers mistakenly identify cells in the human gut as their enemy and decide to attack it, causing ulcers in the mucosa. As a result children may develop fever, abdominal pain, loose stools and at times bloody diarrhoea. These children may not absorb macro and micronutrients and hence lose weight, muscle mass, become anemic and may have vitamin deficiencies. I explained to the parents that there were two types of IBD – *Ulcerative colitis* which affects only the large bowel and *Crohn's disease* which can affect any part of the gut from mouth to anus. Sometimes when we find it difficult to distinguish between these two conditions, we label it *Indeterminate Colitis* for a while until it evolves into one of the above conditions.

'Why did this happen to my child?'

This calls for a longer answer. Almost 20 years ago when I trained in paediatric gastroenterology at Sanjay Gandhi Postgraduate Institute, Lucknow; this condition was considered very rare in Indian children. Our adult gastroenterology colleagues saw IBD patients more frequently than we did (paediatric gastroenterologists). It was only when I trained at the Royal Childrens Hospital, Melbourne a few years later that I found that IBD in Australia was very common in children too. Then, I did wonder about what would be the value of learning so much about a condition that is very common in the Western world but so rare in India. Next, I started to hear reports of IBD rising in incidence in children of Indian origin parents who migrated to the West. Gradually it became clear that IBD can affect children of all ethnicities and socioeconomic status. 15 years later, I am now treating more than a



A capsule packed with electronics and genetically engineered living cells at Cambridge, Mass. Researchers at MIT, who tested the swallowable device in pigs, say it correctly detected signs of bleeding. The results suggest a smaller version of the capsule could eventually be used in humans to find signs of ulcers, inflammatory bowel disease or even colorectal cancer. AP

hundred children with this condition from all over India.

But that was just a background. There is no easy answer to the question 'Why does IBD affect my child?' Medical research is still ongoing to pinpoint the exact cause. What is known is that children who are susceptible to IBD often have a weak or dysregulated immune system which responds inappropriately to environmental triggers such as a virus or bacteria. There may also be genetic factors which predispose these children to IBD as sometimes it seems to affect members of the same family. The human gastrointestinal tract harbours millions of microorganisms; often referred to as gut microbiota and this plays an important role in IBD. The gut microbiota of each individual is unique and influences health and disease. The nature and composition of gut microbiota can be altered by frequent antibiotics. Similarly, westernisation of food habits and lifestyle is also strongly linked to changes in the gut microbiota and a predisposition to develop IBD.

How can we treat and cure her?

IBD – Crohn's disease can be treated with very effective medications that control the inflammation and suppress the dysregulated and overactive immune system. These medications include steroids and a new class of drugs called biologics. But it is also possible to control the inflammation in the gut and heal ulcers in some children with the milder variety of Crohn's disease; without drugs using 'exclusive enteral nutrition'. Once the inflammation or acute flare up of the disease is under control, we aim to keep



Westernisation of food habits and lifestyle is also strongly linked to changes in the gut microbiota and a predisposition to develop IBD

the disease under control (remission) for several years using milder immunosuppressant drugs and a special Crohn's disease exclusion diet (CDED). IBD – Ulcerative colitis is also treated similarly, though another group of drugs called 'aminosalicylates' are used to treat milder forms of Ulcerative colitis. Exclusive Enteral Nutrition has not been found to be useful in treating Ulcerative Colitis.

Both forms of IBD are often chronic and need several years of medical therapy. A small minority of children who have remained in very good control (remission) for several years continue to do well even after stopping medications. The larger majority of children seem to need medications to keep the disease under remission. Further a small proportion of children who have uncontrolled inflammation develop complications needing surgery. But the good news is that science is rapidly evolving and new medications are being developed to treat IBD. Besides the world is much better connected today than before making it easy for developments in research in one part of the world to reach another.

Durga listened to all of this in rapid attention and asked me if she had Ulcerative colitis or Crohn's disease. I replied – Crohn's disease. She then asked

me if it was mild or severe; to which I replied that she had a severe flare up. She understood that simple diet therapy would not work and the family agreed to medication. With every week, she grew stronger and gained weight and achieved remission. She went on to receive milder drugs and continued to remain well for 2 months before yet another flare-up. She was disappointed; but ready for the challenge. She was then commenced on 'biologics' and remained in very good remission for the next 2 years; after which they were stopped. She has now remained in very good remission for the last 3 years without any flares and wants to study to become a doctor.

Durga is one of several success stories treated at our outpatient IBD clinic, but many struggle due to financial constraints and the very high cost of 'biologics'. There are also those who suffered because of the lack of timely & proper diagnosis of IBD. This is possibly because IBD has protean clinical manifestations ranging from a simple anaemia and failure to gain weight to fever, abdominal pain and loose stools. Patients and doctors often struggle to diagnose IBD and it is often mistaken for tuberculosis.

There is hence a need for increased awareness of this condition, both among the general public and medical community.

The writer is a senior paediatric gastroenterologist with a special interest in IBD at Kanchi Kamakoti CHILDS Trust Hospital, Chennai. The hospital recently hosted a national paediatric IBD conference to observe World IBD week – May 19 to May 26.

THE GIST

Susceptible children often have a weak or dysregulated immune system which responds inappropriately to environmental triggers such as a virus or bacteria. There may also be genetic factors which predispose these children to IBD as it sometimes affects members of the same family

IBD is often chronic and needs several years of therapy. A small minority of children who have remained in very good control for several years continue to do well even after stopping medications. The larger majority of children seem to need medications. A small proportion of children need surgery

Many patients struggle with the very high cost of 'biologics'. There are also those who did not receive timely and proper diagnosis, possibly because IBD has protean clinical manifestations. Patients and doctors often struggle to diagnose IBD and it is often mistaken for tuberculosis

Types of Inflammatory Bowel Disease (IBD)

There are two main types of IBD: Crohn's disease & Ulcerative colitis.

Ulcerative colitis only affects the inner lining of the colon and rectum. It is characterized by inflammation and ulcers that form in the lining of the colon.



Ulcerative colitis

Crohn's disease can affect any part of the digestive tract, from the mouth to the anus. It is characterized by inflammation that can spread deep into the layers of the affected tissue.



Crohn's disease

- **Susceptible children often have a weak or dysregulated immune system which responds inappropriately to environmental triggers such as a virus or bacteria.**
- **There may also be genetic factors which predispose these children to IBD as it sometimes affects members of the same family**

The tobacco epidemic in India

Tobacco causes a wide range of diseases and affects those consuming it as well as those cultivating it. There is a need for up-to-date data to understand trends in tobacco use to tackle the tobacco industry

EXPLAINER

Varun Raj Passi
Parth Sharma

Tobacco is the most widely recognised preventable cause of disease and death in the world. It causes a wide range of diseases and affects those consuming it as well as those cultivating it. After China, India has the world's highest number of tobacco consumers – nearly 26 crore, according to an estimate in 2016-2017. Additionally, the health of more than 60 lakh people employed in the tobacco industry is also placed at risk because of the absorption of tobacco through the skin, which can cause various diseases. Tobacco's deleterious influence extends beyond human health. It is a highly erosive crop that rapidly depletes soil nutrients. This requires more fertilizers to be used which further worsens soil quality. The plant is also a major contributor to deforestation. Up to 5.4 kg of wood is required to process 1 kg of tobacco. The production and consumption of tobacco generates nearly 1.7 lakh tonnes of waste every year in India. Therefore, tobacco production and use impose a heavy economic burden on India. A 2021 study estimated that the country incurred a loss exceeding 1.7 lakh crore as a result of tobacco's effects on the health of its consumers in the fiscal year 2017-2018. To compare, the Union Budget allocated for health in the same year was ₹48,000 crore. In addition, cleaning up tobacco waste has been estimated to cost close to ₹6,367 crore these estimates exclude the costs due to soil erosion and deforestation.

The status of tobacco use in India
The Global Adult Tobacco Survey (GATS), the Global Youth Tobacco Survey (GYTS), and India's National Family Health Survey (NFHS) capture the status of tobacco use in India. GYTS assesses tobacco use in students between the ages of 13 and 15 years and GATS and NFHS in people above 15 years of age.

Overall, the results of these surveys have been promising: tobacco use has gone down in the population groups studied by these surveys. An exception to this is tobacco use in women, which went up by 2.1% between 2015-2016 and NFHS 2019-2021. This said, a major caveat is that no survey has been conducted since the COVID-19 pandemic.

Awareness and control programmes
India is one of the 168 signatories of the WHO's Framework Convention on Tobacco Control (FCTC), launched in 2005. It aims to reduce tobacco usage worldwide by helping countries develop demand and supply reduction strategies. A law to govern tobacco sales in India has existed since 1975 and was amended in 2003. The Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply, and Distribution) Act (COTPA) 2003 has 33 sections governing the production, advertisement, distribution, and consumption of tobacco. India also launched the National Tobacco Control Program (NCTP) in 2007. NCTP is designed to improve the implementation of COTPA and FCTC, improve awareness about the harms of tobacco use, and help people quit it. Apart from these interventions, tobacco taxation – a globally accepted method to effectively control tobacco use – is also applied in India.

However, existing measures are poorly implemented. Smokeless tobacco

To go up in smoke

Nearly 26 crore Indians are tobacco consumers, according to an estimate in 2016-2017. While usage and consumption has been going down, effective tobacco control is still a pipe dream

Chart 1: Comparison of monthly consumption of bidis and cigarettes between National Tobacco Control Program (NCTP) districts and non-NCTP districts

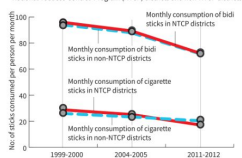
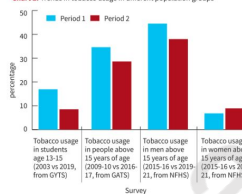


Chart 2: Trends in tobacco usage in different population groups



Source: NFHS, GATS, and GYTS

products (SLTs) have predominantly been non-compliant with COTPA's packaging guidelines. Smuggled tobacco products – both smoked and smokeless forms – have also been badly regulated. To worsen matters worse, the fines for violating COTPA regulations have not been updated since 2003. Furthermore, a tobacco company is fined a maximum of only ₹5,000 for violating packaging restrictions for the first time.

Further, while the COTPA has direct advertisements, the position on indirect advertisements is unclear, which has allowed surrogate advertisements: they popularise the brand using a proxy product like a chair, to promote tobacco manufactured by the same brand. The ICC Men's Cricket World Cup 2023 displayed surrogate advertisements for at least two tobacco brands, which were endorsed by famous cricketers. These advertisements are problematic as they indirectly promote tobacco use.

Becoming more affordable
Amendments to COTPA had been proposed in 2015 and 2020. The changes suggested in 2015 included regulations on surrogate advertisements, inclusion of films and video games in the definition of advertisement, and increasing the fine for violation of advertisement norms by a factor of 10. The amendment proposed in 2020 would have made licensing necessary for the production, supply, and distribution of tobacco products. But neither bill was passed.

The NCTP's effectiveness has also come into question. A 2018 study in the journal *BMJ Tobacco Control* reported no significant difference in the reduction of bid or cigarette consumption between NCTP and non-NCTP districts. Possible reasons for this included insufficient staffing, resource allocation, and utilisation, and lack of

monitoring mechanisms. The Indian government's efforts to levy excise duty on tobacco have also been weakened by tax evasion, such as by purchasing tobacco products in lower tax jurisdictions, and illegal methods such as smuggling, illicit manufacturing, and counterfeiting. Low tobacco taxes in India, which have not matched the rise in people's income, have kept tobacco affordable over the years. A 2021 study in *BMJ Tobacco Control* reported that cigarettes, bidis, and SLTs had become more affordable in the preceding 10 years and that transitioning to the Goods and Services Tax regime had rendered cigarettes and SLTs more affordable.

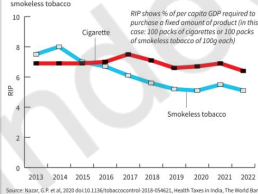
Tax measures and lobbying
Rijo John, an economist and tobacco policy analyst, estimated the tax burden to be 51% for cigarettes, 22% for bidis, and 41% for SLTs, much lower than the FCTC's recommendation of at least 75% tax. The tobacco lobby often argues that high taxes on tobacco lead to tax evasion. However, non-tax factors are equally, if not more, important. These factors include weak governance, high levels of corruption, poor government commitment to tackling illicit tobacco, ineffective customs and tax administration, and informal distribution channels for tobacco products.

In a progressive move, the Prohibition of Electronic Cigarette Act (PECA), 2019 banned e-cigarettes in India – yet they continue to remain a major public health challenge in the country. (The safe amount of tobacco is zero, and e-cigarettes' usefulness in de-addiction has been questioned.) In one online survey completed by 840 adults, 23% reported having used e-cigarettes and 8% reported daily use.

Finally, the role of lobbying by the tobacco industry can't be understated.



Chart 3: Trends in Relative Income Price (RIP) for cigarettes and smokeless tobacco



Source: NFHS, GATS, and GYTS

Effective lobbying has led to the exemption of cess on bidis and smaller tobacco manufacturers to be continuously extended. It is public knowledge that government officials, both in-service and retired, engage with the tobacco industry. For example, a retired Indian Administrative Services officer joined the board of Godfrey Phillips as an independent director in 2022. Moreover, the Central government holds a 7.8% stake in ITC Ltd., India's largest tobacco company. India's score on the tobacco interference in the preceding 10 years and that transitioning to the Goods and Services Tax regime has rendered cigarettes and SLTs more affordable.

Catching up with industry
COTPA, PECA, and NCTP provided a strong framework to successfully control tobacco production and use in India. But they need to be implemented more stringently. In addition, the tax on tobacco products also needs to be increased in line with the recommendations of the FCTC, inflation, and GDP growth.

With government support, it is also possible to help tobacco farmers switch to farming alternate crops, avoiding loss of livelihood, as shown by multiple studies conducted by the Central Tobacco Research Institute. In fact, for large-scale tobacco farmers, the net return per rupee of investment in lower cultivation (1.84) is higher than tobacco (1.48). There is also a need for up-to-date data to understand trends in tobacco use to tackle the tobacco industry, which modifies its sales strategies based on readily available sales trends. Without such data, we will always remain a step behind the industry, and effective tobacco control will remain nothing but a pipe dream.

Varun Raj Passi and Parth Sharma are public health researchers at the Association for Socially Applicable Research (ASAR).

THE GIST

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Tobacco consumption in india

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Global AI chips revenue will grow 33% in 2024: Gartner



The Hindu Bureau

BENGALURU

Revenue from artificial intelligence (AI) semiconductors globally is expected to total \$71 billion in 2024, a rise of 33% from 2023, according to the latest forecast by Gartner Inc.

“Today, generative AI (GenAI) is fueling demand for high-performance AI chips in data centres,” said Alan Priestley, VP Analyst at Gartner. “In 2024, the value of AI accelerators used in servers, which offload data processing from microprocessors, will total \$21 billion, and increase to \$33 billion by 2028,” Mr. Priestley added.

Gartner forecasts AI PC shipments will reach 22%



‘Smarter’ computers: Gartner forecasts AI PC shipments will reach 22% of total PC shipments in 2024. REUTERS

of total PC shipments in 2024, and by the end of 2026, 100% of enterprise PC purchases will be an AI PC. AI PCs include a neural processing unit (NPU) enabling them to run longer, quieter and cooler and have AI tasks running continuously in the background, creating new op-

portunities for leveraging AI in everyday activities.

While AI semiconductor revenue would continue to experience double-digit growth through the forecast period, 2024 was expected to experience the highest growth rate during that period, Gartner predicted.

Artificial intelligence (AI) semiconductors

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- **AI PCs include a neural processing unit (NPU) enabling them to run longer, quieter and cooler and have AI tasks running continuously in the background, creating new opportunities for leveraging AI in everyday activities.**
- **While AI semiconductor revenue would continue to experience double-digit growth through the forecast period, 2024 was expected to experience the highest growth rate during that period.**

How will AI affect semiconductor design and production?

- **AI demands will have lasting impacts on semiconductor design and production. In large part, this is because the amount of data processed and stored by AI applications is massive.**
- **Semiconductor architectural improvements are needed to address data use in AI-integrated circuits.**
- **Improvements in semiconductor design for AI will be less about improving overall performance and more about speeding the movement of data in and out of memory with increased power and more efficient memory systems.**
-

- **One option is the design of chips for AI neural networks that perform like human brain synapses. Instead of sending constant signals, such chips would “fire” and send data only when needed.**
- **Nonvolatile memory may also see more use in AI-related semiconductor designs. Nonvolatile memory can hold saved data without power. Combining nonvolatile memory on chips with processing logic would make “system on a chip” processors possible, which could meet the demands of AI algorithms.**

- **While semiconductor design improvements are emerging to meet the data demands of AI applications, they pose potential production challenges.**
- **As a result of memory needs, AI chips today are quite large.**
- **With this large chip size, it is not economically easy for a chip vendor to make money while working on a specialized hardware. This is because it is very costly to manufacture a specialized AI chip for every application.**
- **A general-purpose AI platform would help address this challenge. System and chip vendors would still be able to augment the general-purpose platform with accelerators, sensors, and inputs/outputs**

PHNOM PENH

Cambodia to begin work on controversial canal in August: PM



AP

▲ Cambodia will start work on a \$1.7-billion canal linking the capital Phnom Penh to the sea in August, Prime Minister Hun Manet said on Thursday. The Chinese-backed Funan Techo canal has sparked fears in neighbouring Vietnam that it could be used by Chinese warships, and reduce Cambodian dependence on their ports. AFP

The Funan Techo canal



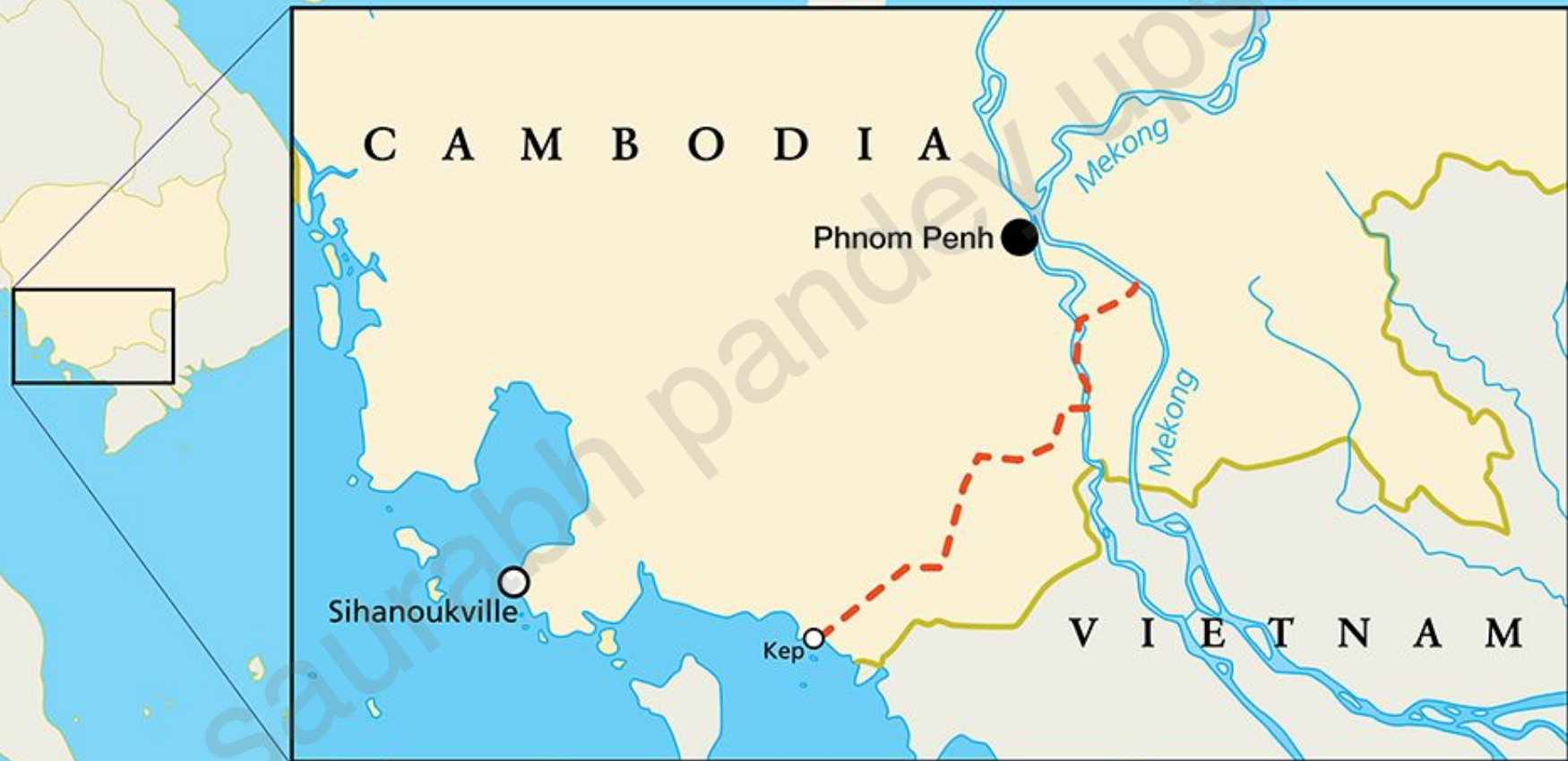
- **Cambodia's planned 180-kilometre Funan Techo Canal**, worth US\$1.7 billion, is funded by China as a part of the Belt and Road Initiative.
- This canal provides a waterway linking the capital Phnom Penh and the deep seaport in the coastal province Kep, ultimately opening onto the South China Sea.
- The Cambodian government hopes that this ambitious project may **foster economic development** by facilitating the transportation of goods and eco-tourism, along with an estimated **5 million jobs** to be created.
- Moreover, the Funan Techo waterway would **reduce Cambodia's dependence on Vietnam's seaport**, notably Cai Mep.



- The canal project may bring economic benefits to Cambodia, however, it has lead to mounting concerns within neighbouring Vietnam.
- **Water security** is a particular concern, with the canal is thought to act like a dam, altering the flow of the river and preventing water from reaching areas in the Mekong Delta in the south of Vietnam.

- The project also brings geopolitical anxiety for Vietnam.
- The canal thought to have “**dual-use**” potential – that is, promoting economic growth and domestic connectivity for Cambodia, but it could also facilitate China’s military presence in the country.
- The canal is said to connect the Ream naval base in Sihanoukville, recently refurbished with Chinese funding.
- two Chinese navy frigates docked at the base. Security concerns have been raised about **the ability of vessels to transit** the Funan Techo canal from the Gulf of Thailand

PROPOSED FUNAN TECHO CANAL



IR IN NEWS

- **Nigeria changes its national anthem, angering citizens irked over reforms**
- **Spain's Parliament gave the final green light to a controversial amnesty Bill for Catalan separatists paving the way for the return of their figurehead Carles Puigdemont.**
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From deep down



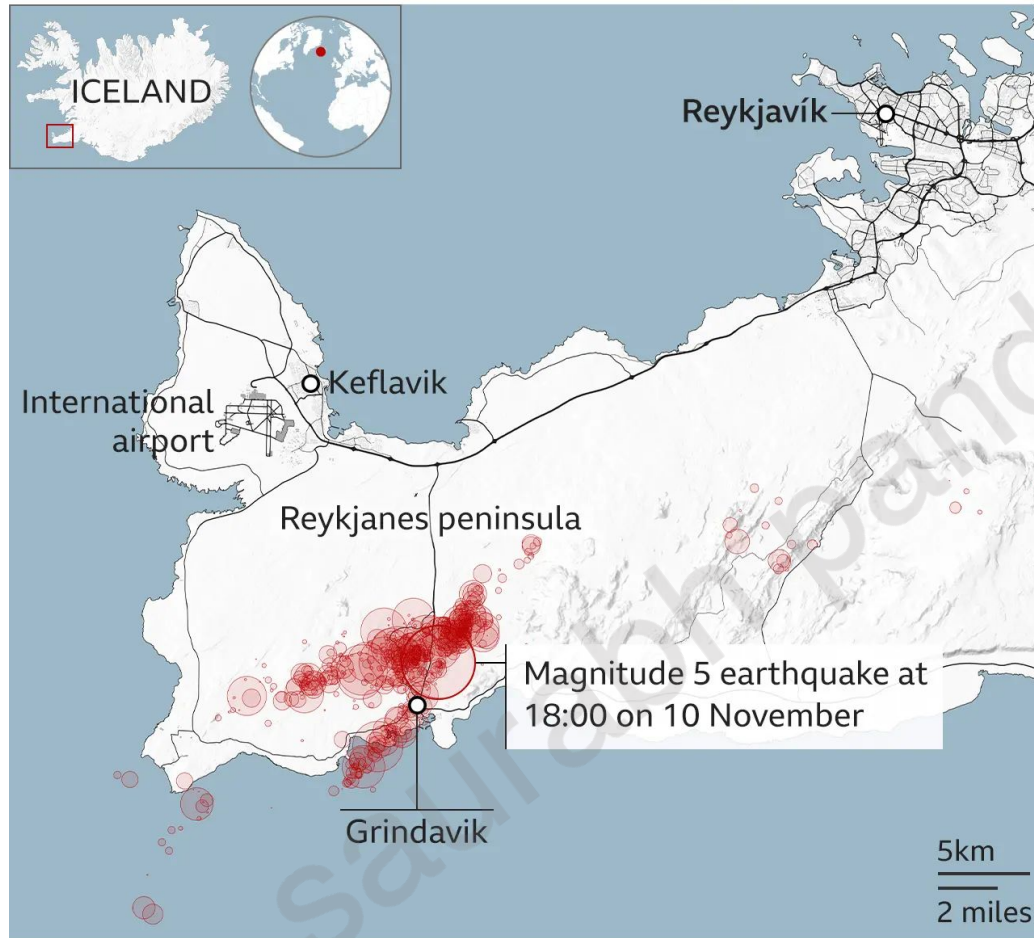
Smoke and lava: A handout picture released by the Icelandic Coast Guard shows billowing smoke and flowing lava pouring out of a new fissure, during a surveillance flight above a new volcanic eruption on the outskirts of the evacuated town of Grindavik, western Iceland. AFP

Blue Lagoon

- The Blue Lagoon is a **geothermal spa** in southwestern **Iceland**.
- The spa is located in a **lava field** 5 km (3.1 mi) from **Grindavík** and in front of Mount **Þorbjörn** on the **Reykjanes Peninsula**, in a location favourable for geothermal power, and is supplied by water used in the nearby **Svartsengi geothermal power station**.

- The lagoon is man-made. The water is a byproduct from the nearby **geothermal power** plant **Svartsengi** where **superheated water** is vented from the ground near a lava flow and used to run **turbines** that generate electricity.
- After going through the turbines, the steam and hot water pass through a **heat exchanger** to provide heat for a municipal **water heating** system. Then the water is fed into the lagoon.

Earthquake magnitude · 2 · 3 · 4 · 5



Source: Icelandic Meteorological Office (data from 20 Oct to 13 Nov)

BBC

Iceland's 'seismic swarm'

Over 2,000 quakes detected over the last 48 hours as volcanic eruption looms

As of Nov 13, 0830 GMT

North American
plate

Eurasian
plate

ICELAND

REYKJAVIK

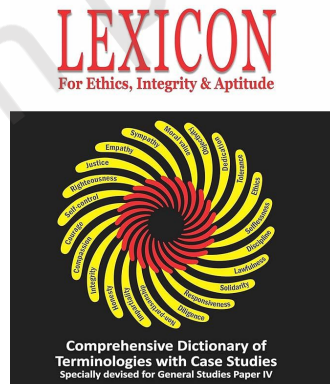
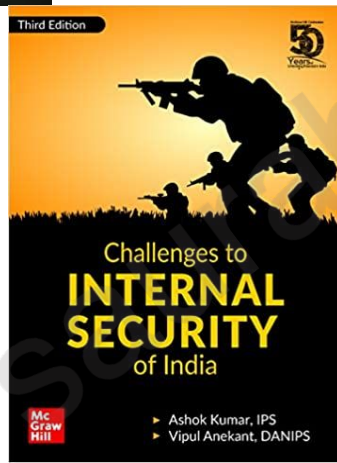
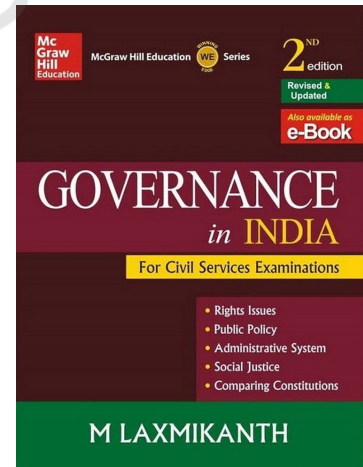
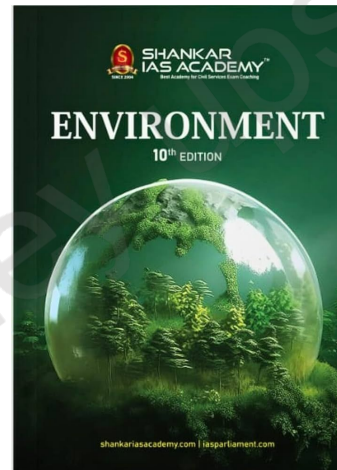
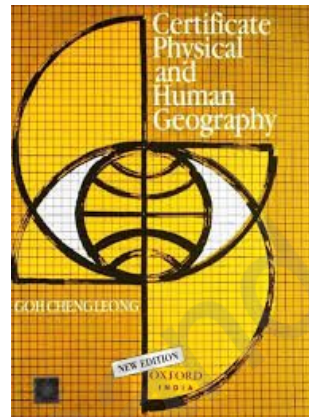
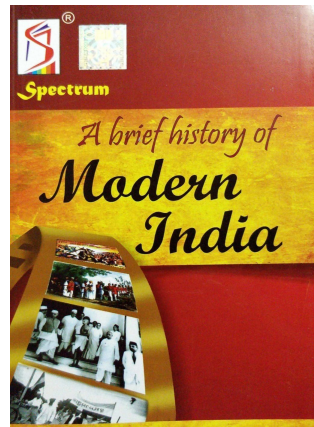
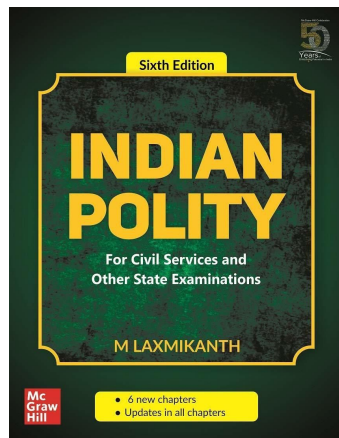
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Magnitude

- 0.1-1
- 1-2
- 2-3
- 3-4.1



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Target Mains -2024/25

Q "Hydro diplomacy will shape relationship between countries in south and southeast asia" Discuss

प्रश्न "हाइड्रो डिप्लोमेसी दक्षिण और दक्षिण-पूर्व एशिया के देशों के बीच संबंधों को आकार देगी" चर्चा करें

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